

In this issue of the Environmental Health and Safety (EHS) Listserv, August 31, 2012:

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1. Creating Safety Cultures in Academic Institutions

The American Chemical Society (ACS), an organization which represents professionals at all degree levels and in all fields of chemistry and sciences that involve chemistry, is the world's largest scientific society, and one of the world's leading sources of authoritative scientific information.

The ACS Safety Culture Task Force (SCTF) has released its final report on ***“Creating Safety Cultures in Academic Institutions: A Report of the Safety Culture Task Force of the ACS Committee on Chemical Safety.”*** The recommendations in this report follow a call to action by the U.S. Chemical Safety Board (CSB), which recently claimed that safety gaps in university labs threatened more than 110,000 graduate students and postdoctoral researchers in the United States. The CSB made this assertion following several incidents at various universities that led to serious student injury or death.

The SCTF report provides guidance, suggestions, examples, and recommendations that will help strengthen the safety culture in two- and four-year undergraduate, graduate, and postdoctoral programs. It identifies:

- The best elements and best practices of a good safety culture
- Specific recommendations that could be used by universities and colleges
- Tools and resources that will help strengthen the safety culture

This publication, to assist academia in strengthening and building a safety culture, came about in response to the many incidents involving serious injury or death which have occurred in academic laboratories. Another consideration was the observation that college and university graduates progressing into the workplace do not exhibit strong safety skills. The report presents more than 80 suggested laboratory safety topics and provides numerous resources for preparing laboratory safety lessons.

This document is NOT just for chemistry laboratories. The SCTF states, “While the focus of this document is on departments offering chemistry, the safety culture of an institution needs to include all departments and organizations throughout the entire campus. Thus, other departments may find useful parallels in these discussions.

Safety is a positive value—it prevents injuries, saves lives, and improves productivity and outcomes.”

EHS provides a number of online resources to assist the UNL campus community with safety, and which support several of the recommendations contained in the SCTF report. The Virtual Manual aggregates safety and regulatory information through user identification of types of work conducted. Once completed, the Virtual Manual serves as the basic written Chemical Hygiene or Hazard Communication Plan for a specific work group or area. The Virtual Manual **MUST** be supplemented with **work/site-specific** procedures/protocols, as appropriate, to fulfill the requirement for a Chemical Hygiene Plan (Labs) or Hazard Communication Plan (Other).

The EHS SOP, JOB SAFETY ASSESSMENTS, assists supervisors in identifying those unique chemical and other hazards that are not addressed by EHS SOPs and are specific to tasks/chemicals used in their particular areas.

Resources:

- ACS “*Creating Safety Cultures in Academic Institutions: A Report of the Safety Culture Task Force of the ACS Committee on Chemical Safety*”
http://portal.acs.org/portal/PublicWebSite/about/governance/committees/chemicalsafety/CNBP_029719
- **Chemical Safety** training <http://ehs.unl.edu/onlinetraining>
- Chemical Safety Safe Operating Procedures (SOPs) <http://ehs.unl.edu/sop/chemical-safety>
- Laboratory Safety SOPs <http://ehs.unl.edu/sop/laboratory-sops>
- Laboratory Safety Colloquium Series <http://ehs.unl.edu/training/Colloquium>
- Virtual Manual <https://scsapps.unl.edu/VirtualManual/>
- **Job Safety Assessments** SOP <http://ehs.unl.edu/sop/s-JSA.pdf>
- CSB Video, Experimenting with Danger
http://www.csb.gov/videoroom/videos.aspx?cid=1&F_All=y
- CSB Case Study, Texas Tech University Laboratory Explosion
http://www.csb.gov/assets/document/CSB_Study_TTU_FINAL.pdf
- CSB Webinar:
http://www.csb.gov/assets/document/TTU_Webinar_Presentation.pdf

2. Personal Protective Equipment (PPE) – Hand Protection

Persons in the following types of jobs are often at risk of hand injury and will need to use appropriate protection when conducting tasks that put them at risk of injury: kitchen personnel, trades workers, custodians, artists, agricultural and landscape workers, animal handlers, mechanics, laboratory workers, and others.

Hand protection is necessary when there is risk of injury due to:

- **Contact with or absorption of** harmful chemicals, microorganisms (such as bacteria, viruses, fungi, etc.) and/or their toxins, and radioactive materials.
- **Contact with sharp objects or surfaces** which could result in severe cuts or lacerations (e.g., knives, saws, barbed wired, etc.).
- **Contact with rough surfaces or materials** that can cause severe abrasions (scrapes), such as sand, concrete block, rocks, ropes, etc.
- **Penetration by sharp objects**, such as nails, splinters, needles/sharps, or even puncture wounds inflicted by animal bites.
- **Exposure to temperature extremes**, which could be associated with **outdoor winter conditions**, heated surfaces (pots, pans, etc.), or cooled surfaces (lab specimens stored at -80 degrees C., etc.).
- **Exposure to temperature extremes associated with processes or products**, for example, cryogenic materials (like dry ice, liquid nitrogen, etc.), and torching or welding operations.
- **Exposure to severe and prolonged/repeated vibration**, such as using a jackhammer, sander, chainsaw, compactor, etc.
- **Potential contact with live electrical systems** operating at greater than 50 Volts AC (alternating current).

According to the Bureau of Labor Statistics (BLS), more than 136,000 serious hand/finger/thumb injuries occur per year. Common hand injuries are:

- Lacerations (cuts)
- Crushing
- Avulsion (skin or part being torn off)
- Punctures

Information on hand protection PPE is contained within the EHS web-based training, ***Personal Protective Equipment (PPE)***. Selection of appropriate hand protection is determined by evaluation of work tasks and work environment as part of a comprehensive risk assessment.

When working with chemicals, consideration must be given to a glove's chemical resistance in terms of degradation, breakthrough time, and permeation rate, as well as an overall indication of whether a particular glove is recommended for a particular chemical based on test data. Other considerations in selecting appropriate hand protection PPE are:

- Presence of mechanical hazards that require protection from abrasion, and/or cut, puncture & tear resistance
- A need for heat resistance for protection against contact with hot surfaces

- Use of cryogenics
- A need for anti-vibration gloves for highly specialized tasks such as operating chainsaws, grinders, nail guns, sanders and other tools/machinery that produce high levels of vibration
- Risk of electrical shock
- Potential exposure to special hazards such as those in welding

Gloves for protection against these hazards are rated by applicable ANSI or similar international body consensus standards. Once hazards are assessed and appropriate hand protection PPE is selected, the supervisor is responsible to provide training to employees so that they know:

- When hand protection PPE is necessary;
- What specific hand protection PPE is necessary;
- How to properly put on, take off, adjust, and wear assigned hand protection;
- The limitations of the assigned hand protection PPE;
- The proper care, maintenance, useful life and disposal of the assigned hand protection PPE.

General instruction on all these items is contained within the EHS web-based training, ***Personal Protective Equipment (PPE)*** and the related EHS SOP, ***Personal Protective Equipment – Hand Protection***.

Resources:

- EHS Web-based ***Personal Protective Equipment (PPE)*** training <http://ehs.unl.edu/onlinetraining/#PPE>
- ***Job Safety Assessments*** SOP <http://ehs.unl.edu/sop/s-JSA.pdf>
- Welding Lens Shade & Personal Protective Equipment (PPE) Selection http://ehs.unl.edu/sop/s-welding_lens_and_ppe.pdf
- ***Personal Protective Equipment – Hand Protection*** SOP http://ehs.unl.edu/sop/s-ppe-hand_protection_0.pdf
- OSHA Standards - Personal Protective Equipment: Hand protection (29 CFR 1910.138) http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9788

3. Risk Assessment: Step 2. Analyze Receptors

A risk assessment is a thorough look at the workplace to identify things, situations, processes, etc. that may cause harm, particularly to people. The goal of the risk assessment process is to create a safer work environment by removing a hazard or reducing the level of its risk by adding precautions or control measures. Risk is the chance that someone could be harmed by a hazard. A hazard is anything that can cause harm, such as chemicals, working from ladders, electricity, machinery, etc. Obviously, the first step in the Risk Assessment process is to identify the

hazards. This step was discussed in the July 2012 edition of the EHS listserv (which can be reviewed on the EHS web page).

The second step once safety hazards have been identified is to determine potential receptors, that is, who and/or what may be harmed and the manner in which harm might occur. Thoughtful consideration and consultation with SMEs (subject matter experts) are tools to complete this step. Evaluation of potential receptors must include consideration of the person conducting the task, but it goes beyond that. Are others in the immediate vicinity at risk? Are others more remotely located also at risk? Also consider environmental receptors. Is there potential for contamination of the land, water, or air? Is there a danger to domestic or wild animals? This evaluation may extend even further to consider damage to equipment, loss of data, financial repercussions, consequences for regulatory non-compliance, etc.

This step of the process should consider potential receptors under normal or expected operating conditions, as well as failure conditions. This simply involves consideration of what might happen if things go wrong. It often involves a worse-case scenario approach.

Next month we will look at Step 3: Evaluate (the likelihood and level of risk). To review last month's "Step 1: Identify Safety Hazards" or any previous issue of the EHS Listserv go online to: <http://listserv.unl.edu/cgi-bin/wa?A0=ehsinfo>.

Resources:

- OSHA Job Hazard Analysis <http://www.osha.gov/Publications/osha3071.pdf>
- Canadian Centre for Occupational Health and Safety: Risk Assessment http://www.ccohs.ca/oshanswers/hsprograms/risk_assessment.html
- European Agency for Safety & Health at Work: Risk Assessment <http://osha.europa.eu/en/topics/riskassessment/index.html>

5. Revised Safe Operating Procedures

➤ **Aboveground Petroleum Storage Tanks** <http://ehs.unl.edu/sop/s-AST.pdf>
Updated Air Quality rules as it relates to motor dispensing facilities.

➤ **Animal Feeding Operations - Documentation & Recordkeeping** http://ehs.unl.edu/sop/s-animal_feed_op-doc%26recordkeep_req.pdf

Updated CAFO (Concentrated Animal Feeding Operations) Annual Report requirements.

➤ **Chemical of Concern – United States Department of Homeland Security Chemical Facility Anti-Terrorism Standards SOP** http://ehs.unl.edu/sop/s-DHS_ChemFacility_Anti-Terrorism.pdf

Removed reference to the regulatory threshold for gases (was not included in the table but the language said it was). General clean up (removal of extra lines and bullets).

➤ **Construction Site NPDES Permits** http://ehs.unl.edu/sop/s-construction_site%20npdes_permits.pdf

Added language that requires construction sites that disturb more than one acre to post conspicuously on site a copy of the completed NOI as submitted to NDEQ and the location of the SWPPP.

➤ **Fire Safety – General Prevention and Extinguishers**

SOP http://ehs.unl.edu/sop/s-fire_safety.pdf

Removed outdated tables that referred to guidance on the number of extinguishers. Also removed information on “PASS” and a few bullets on use and referred the reader to Web-Based Training.

➤ **Forklift/Powered Industrial Truck Safety SOP** <http://ehs.unl.edu/sop/s-forklift.pdf>

Updated to fix typos, add reference to Web-Based Training, add personal fall protection requirement.

➤ **General Guidance for Chemical Ordering, Receipt, Distribution, Use & Storage SOP** <http://ehs.unl.edu/sop/s-ppe.pdf>

Changed "MSDS" to "SDS". Fixed a broken link. Added language to indicate that compressed gas cylinders must not be stored near exit doors.

➤ **On-the-Job Injuries SOP** <http://ehs.unl.edu/sop/s-injury.pdf>

Reflects the recent change in how Workmen’s Comp handles post bloodborne pathogens exposure treatments.

➤ **Personal Protective Equipment for Chemical Exposures**

SOP <http://ehs.unl.edu/sop/s-ppe.pdf>

Added reference to our new SOPs on Hand and Body protection, as well as reference to Personal Protective Equipment (PPE) Web-Based Training.

➤ **Pyrophoric Chemicals SOP** http://ehs.unl.edu/sop/s-pyrophoric_chemicals.pdf

Added reference to the Hand and Body Protection SOPs, PPE Training, and relevant EHS Colloquium presentations. Added a recommendation to practice technique before handling a pyrophoric and have technique evaluated by an experienced person. Added a recommendation to use a properly sized syringe when using this technique to avoid withdrawing the plunger to near the end of the syringe barrel.

➤ **Spill Prevention Control and Countermeasures (SPCC) - Inspections & Fuel Transfer Procedures** [http://ehs.unl.edu/sop/s-SPCC inspections %26 fuel transfer proc.pdf](http://ehs.unl.edu/sop/s-SPCC%20inspections%26fuel%20transfer%20proc.pdf)

Added and removed applicable 'facilities' as it relates to SPCC oil thresholds.

➤ **Storage and Use of Flammable and Combustible Liquids**

SOP <http://ehs.unl.edu/sop/s-flamliq.pdf>

Simplified this SOP by removing reference to various types of occupancies and maximum quantities based on occupancy/sprinkler availability. Also removed the 3 cabinet/room requirement. Made a few other minor changes, primarily related to changes in the NFPA standards.

➤ **(UST) Underground Storage Tanks – Automatic Tank**

Gauging [http://ehs.unl.edu/sop/s-UST automatic tank gauging.pdf](http://ehs.unl.edu/sop/s-UST%20automatic%20tank%20gauging.pdf)

Updated to reflect ATG maintenance and calibration requirements per manufacturer's recommendation. Also updated Regulatory Design ATG systems for leak detection.

➤ **(UST) Underground Storage Tanks - Registrations, Permits, Notifications and Fees** [http://ehs.unl.edu/sop/s-UST registrations permits fees.pdf](http://ehs.unl.edu/sop/s-UST%20registrations%20permits%20fees.pdf)

Updated installation permits section.

➤ **(UST) Underground Storage Tanks - Summary of Recordkeeping Requirements** [http://ehs.unl.edu/sop/s-UST summary recordkeeping requirements.pdf](http://ehs.unl.edu/sop/s-UST%20summary%20recordkeeping%20requirements.pdf)

[http://ehs.unl.edu/sop/s-UST summary recordkeeping requirements.pdf](http://ehs.unl.edu/sop/s-UST%20summary%20recordkeeping%20requirements.pdf)

Added annual ATG maintenance and calibration requirements and updated record retention times.

➤ **(UST) Underground Storage Tanks - Summary of Regulatory**

Requirements [http://ehs.unl.edu/sop/s-UST summary regulatory requirements.pdf](http://ehs.unl.edu/sop/s-UST%20summary%20regulatory%20requirements.pdf)

Updated to reflect title 159 requirements for 'Farm', Deferred and Excluded USTs requirements.

Remember...SAFETY IS AN ATTITUDE!

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